

RNAV STAR Procedural Adherence



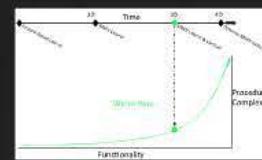
RNAV STAR Procedural Adherence



How Procedures Have Changed

No Procedures

Flying was dangerous and not standardized



Instrument Approach Procedures

A method to consistently guarantee terrain clearance



STARs (conventional)



STARs (RNAV OPD)



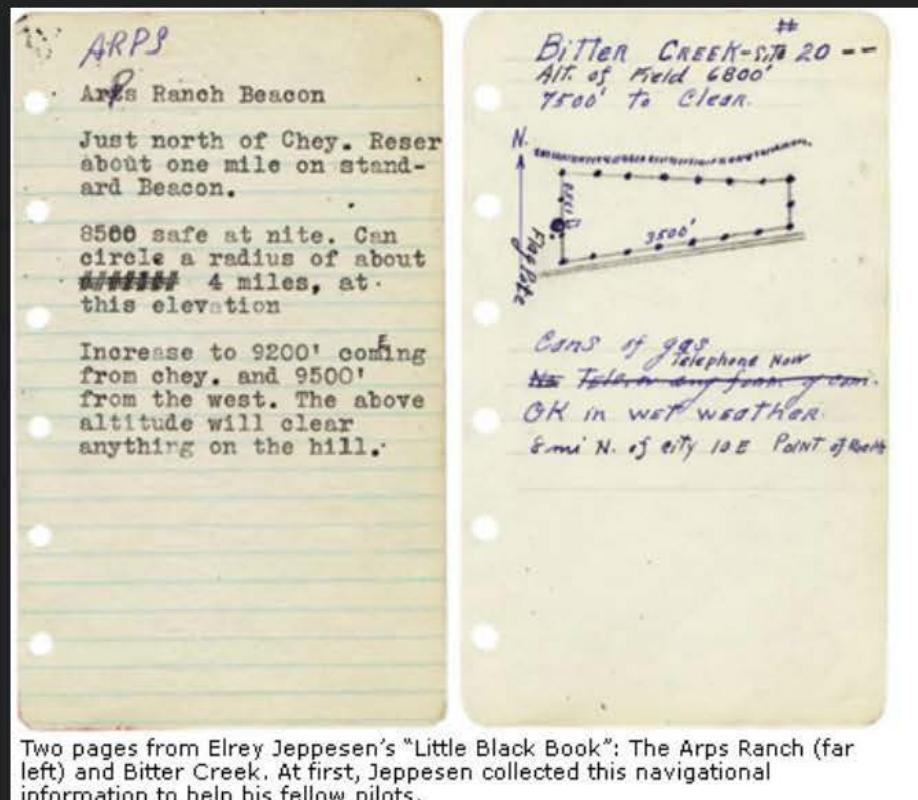
Noise reduction, fuel savings, route standardization, and flow management.
(FAA, 2014)

No Procedures

Flying was dangerous and
not standardized

Instrument Approach Procedures

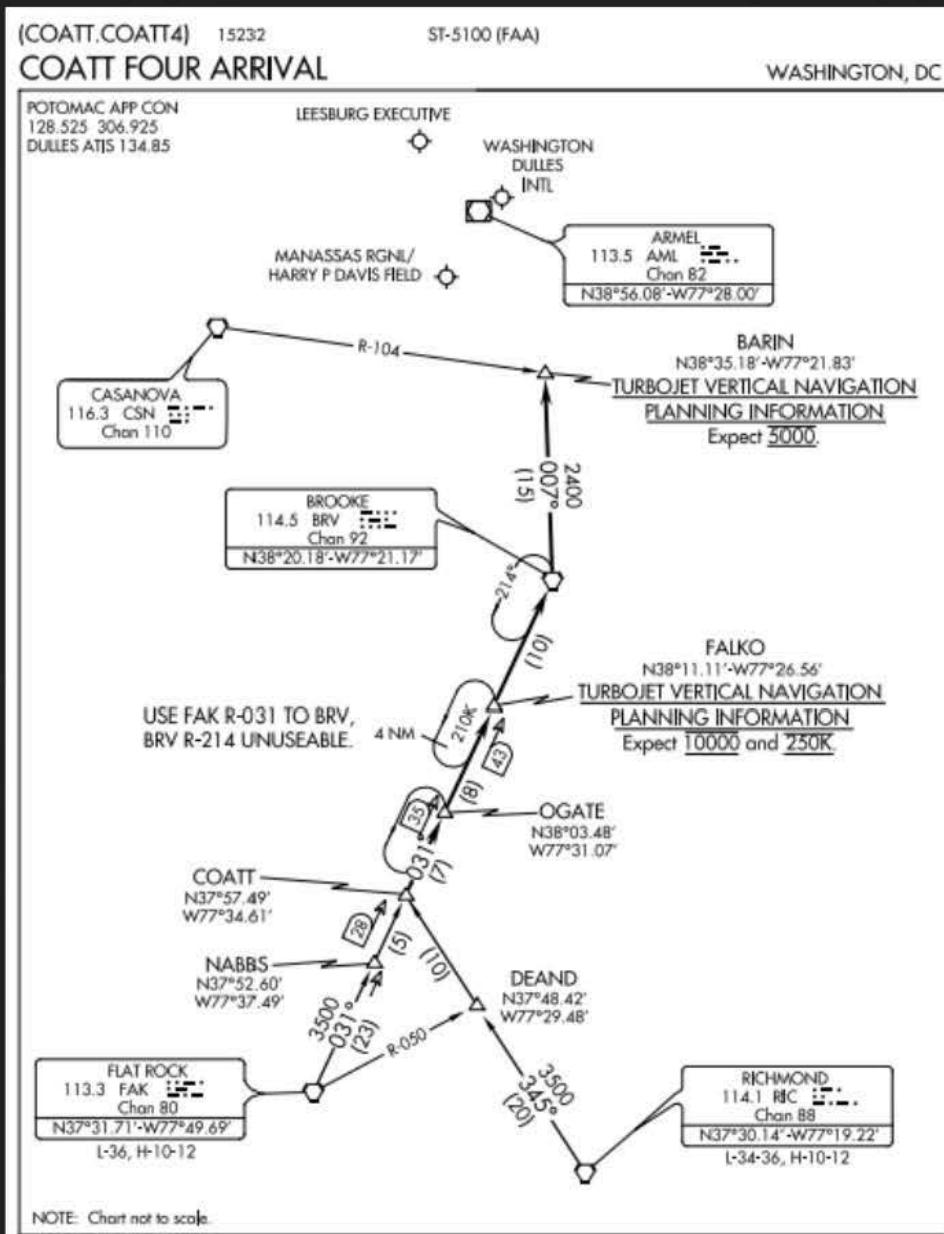
A method to consistently guarantee terrain clearance



Two pages from Elrey Jeppesen's "Little Black Book": The Arps Ranch (far left) and Bitter Creek. At first, Jeppesen collected this navigational information to help his fellow pilots.

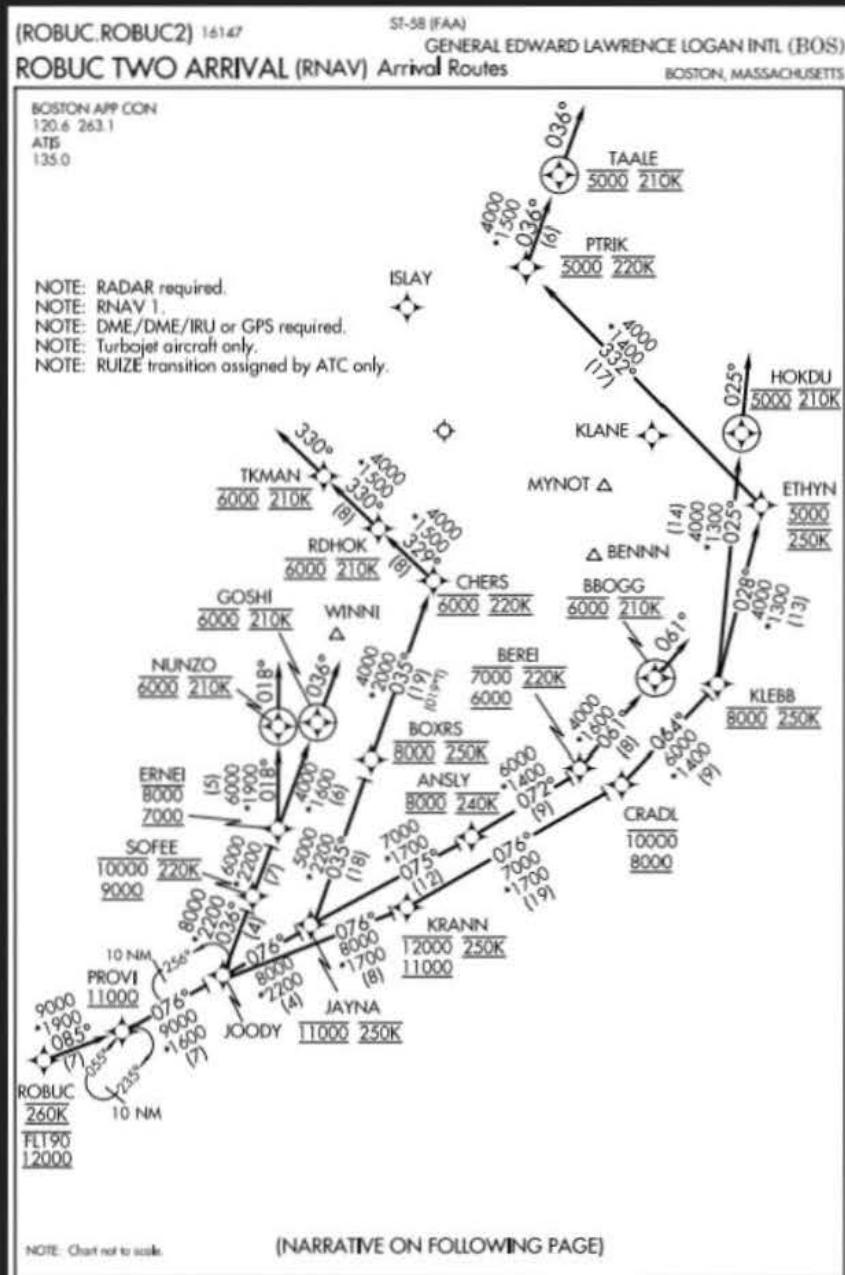
STARs (conventional)

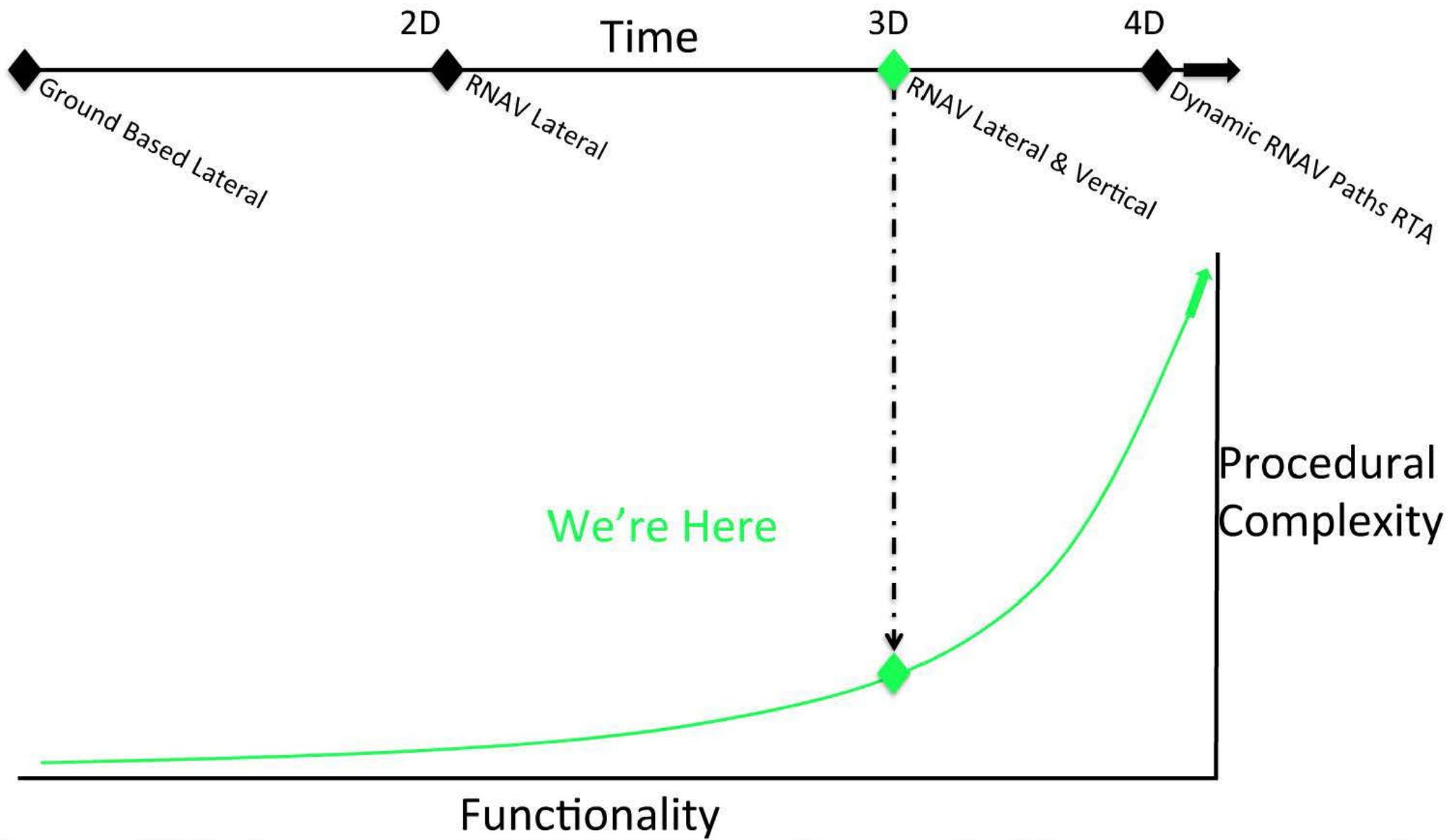
Standardized Routing & Terrain Clearance



STARs (RNAV OPD)

Noise reduction, fuel savings,
route standardization, and
flow management.
(FAA, 2014)





Why we looked at OPD STARs

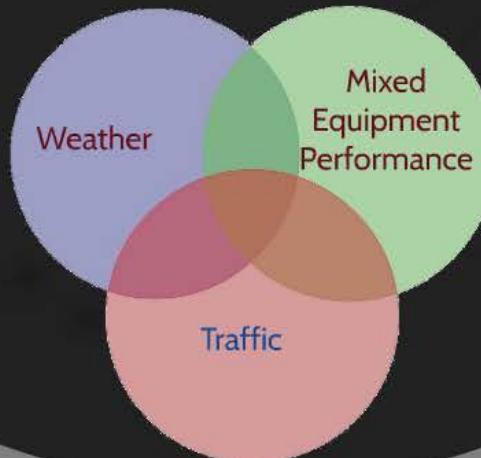
ASRS Reports from Pilots

1. Controller interventions
2. Autopilot and FMS errors
3. Procedure design

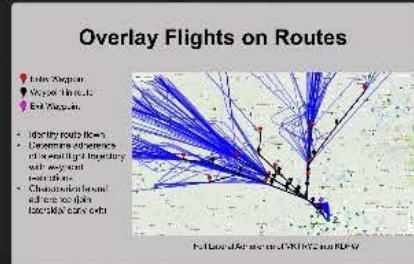
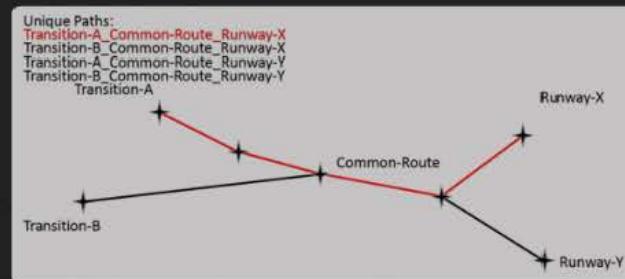
ASRS Reports from Controllers

1. Inter-controller communications
2. Pilot non-compliance
3. Misinterpreted instructions

Factors Influencing Adherence



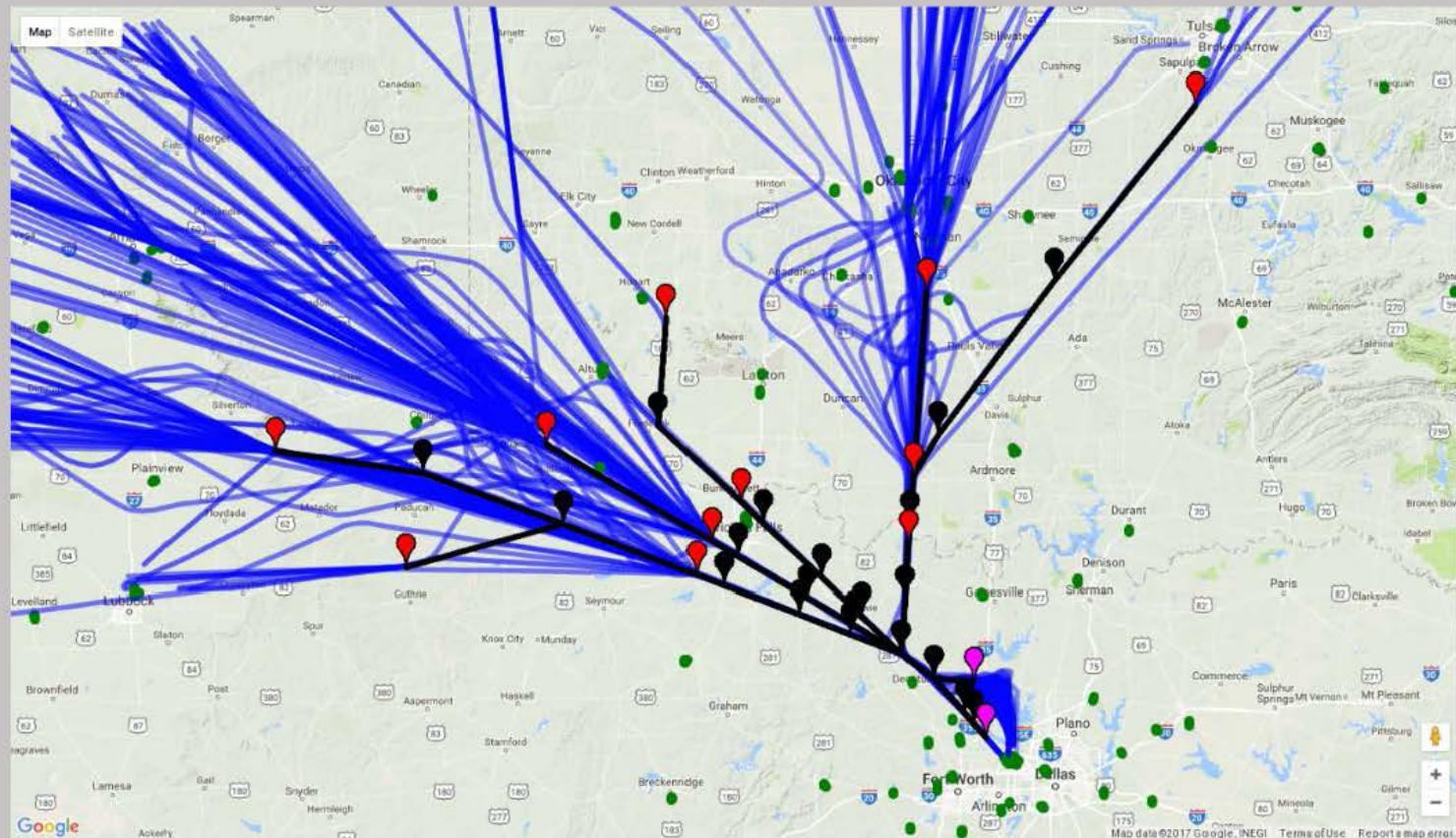
Method



Overlay Flights on Routes

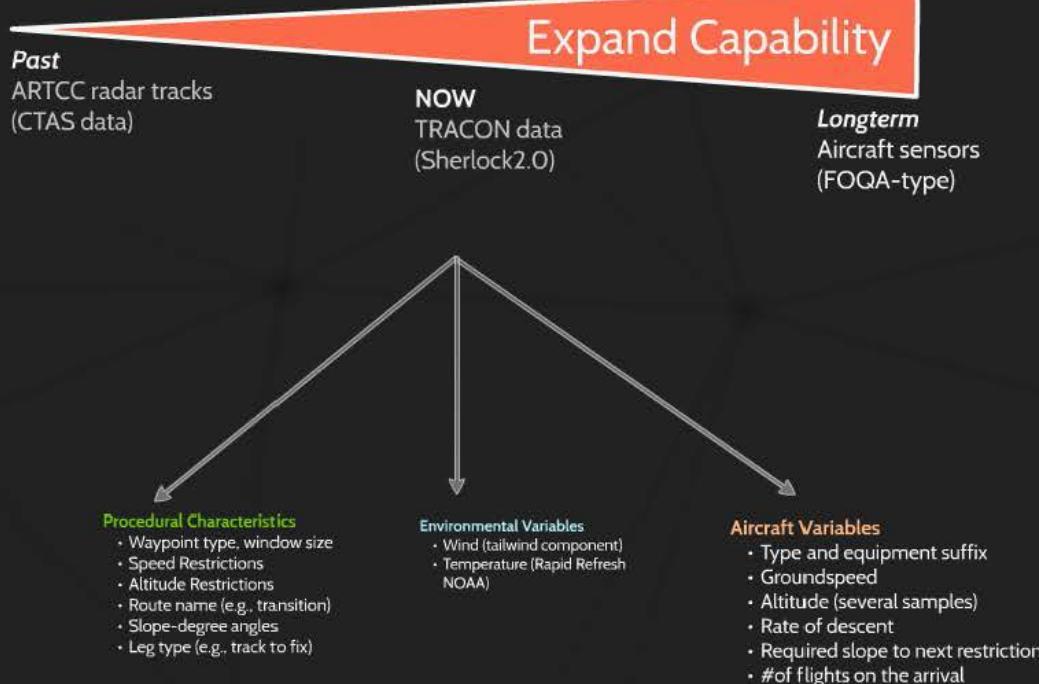
- Entry Waypoint
- Waypoint in route
- Exit Waypoint

- Identify route flown
- Determine adherence of lateral flight trajectory with waypoint restrictions
- Characterize lateral adherence (join late/skip/ early exit)



Full Lateral Adherence of VKTRY2 into KDFW

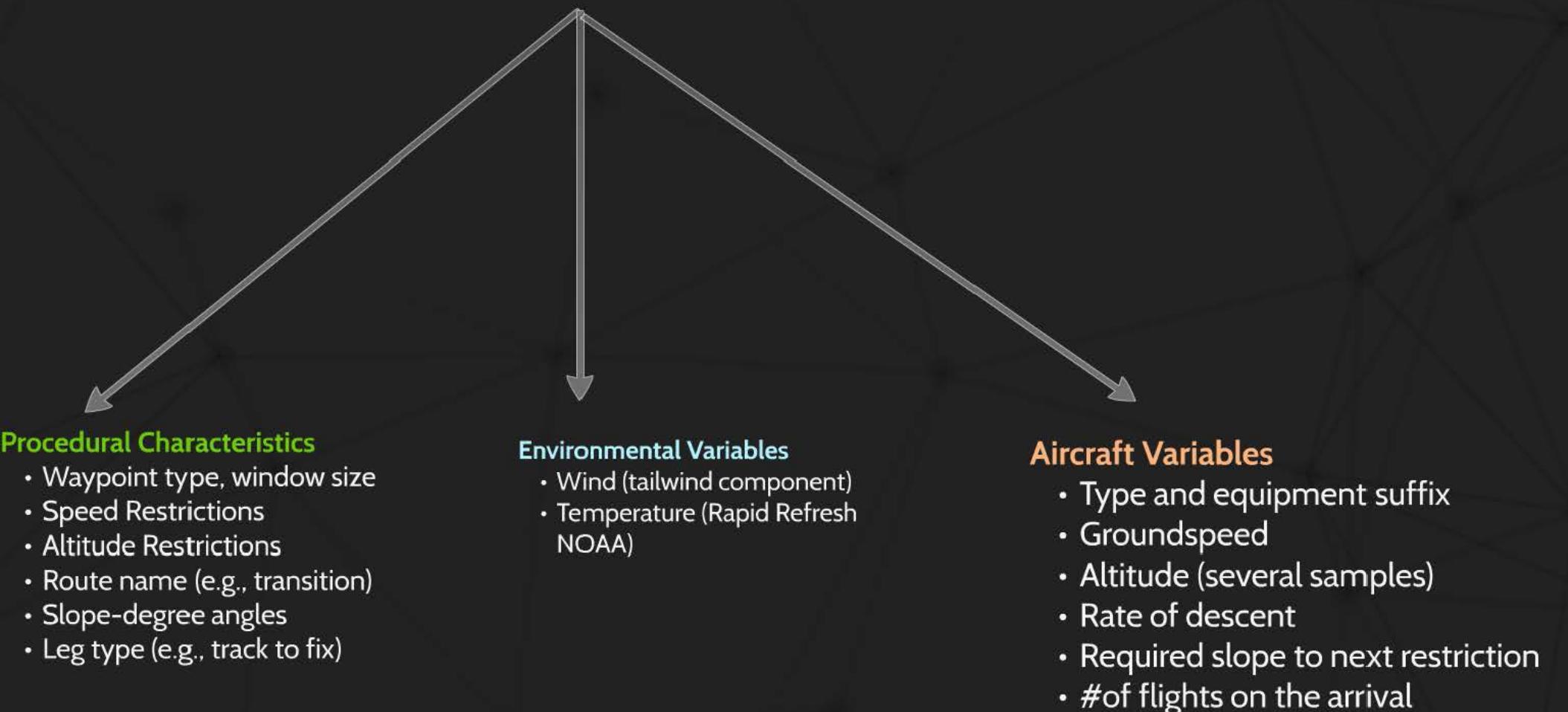
Data Source



ta)

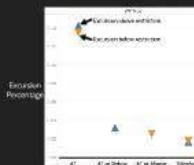
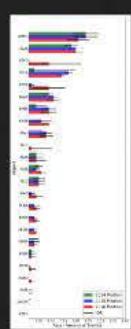
TRACON data
(Sherlock2.0)

Longterm
Aircraft sensors
(FOQA-type)

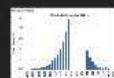


Descriptive Data

Assess Levels of Use

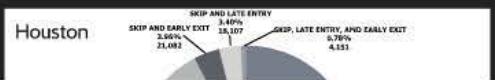
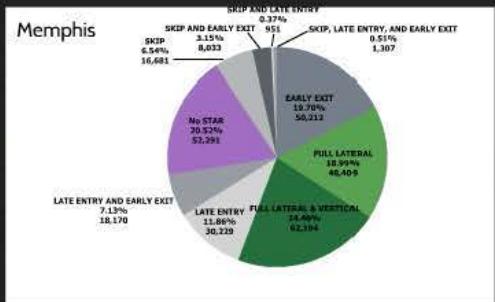
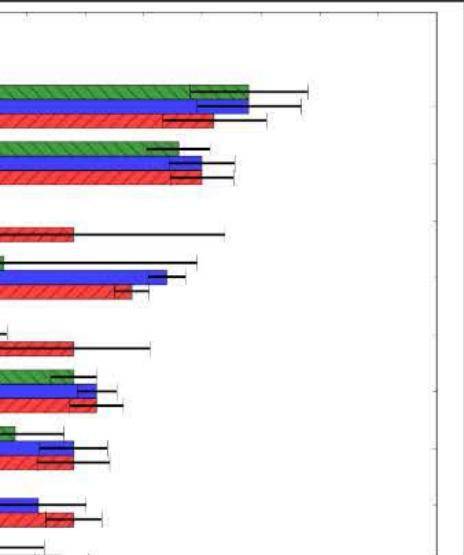


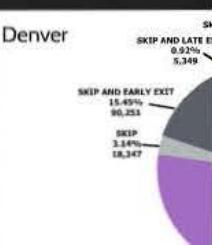
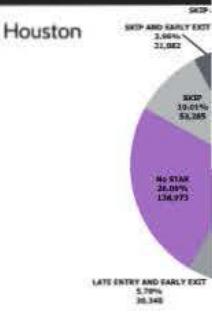
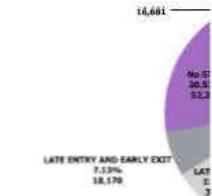
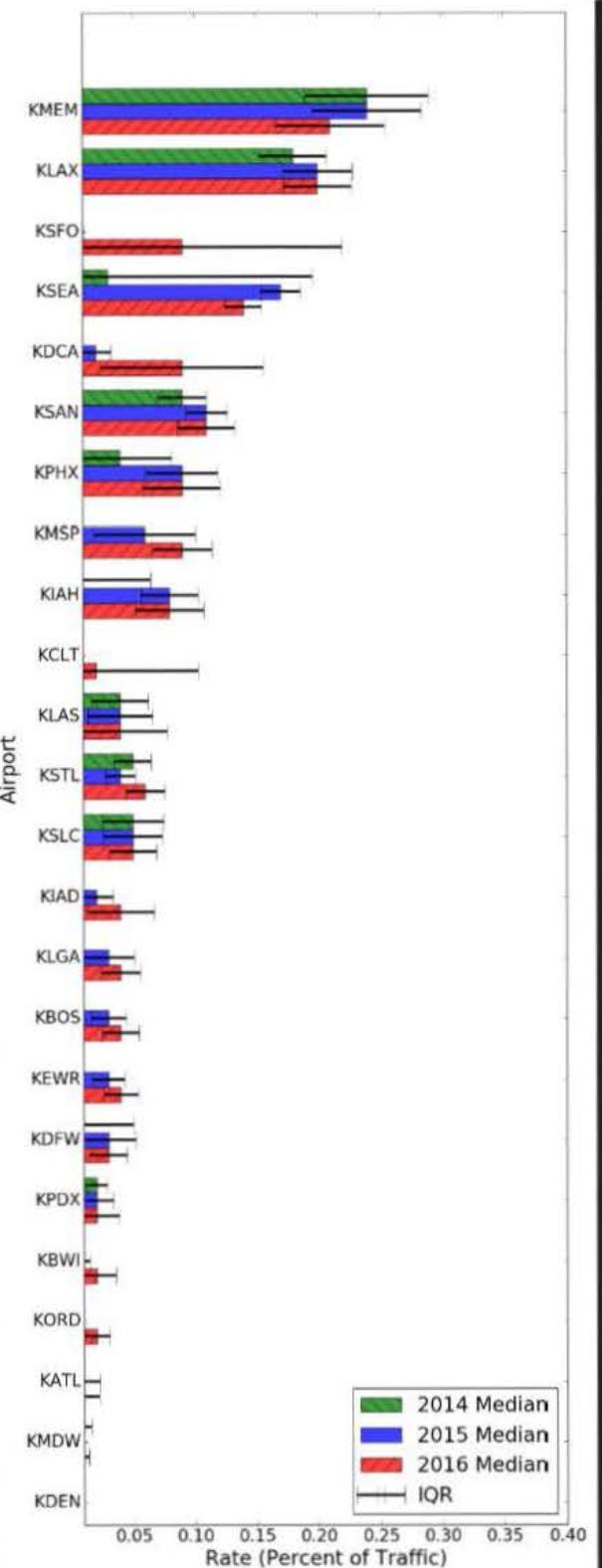
Identify Human Intervention



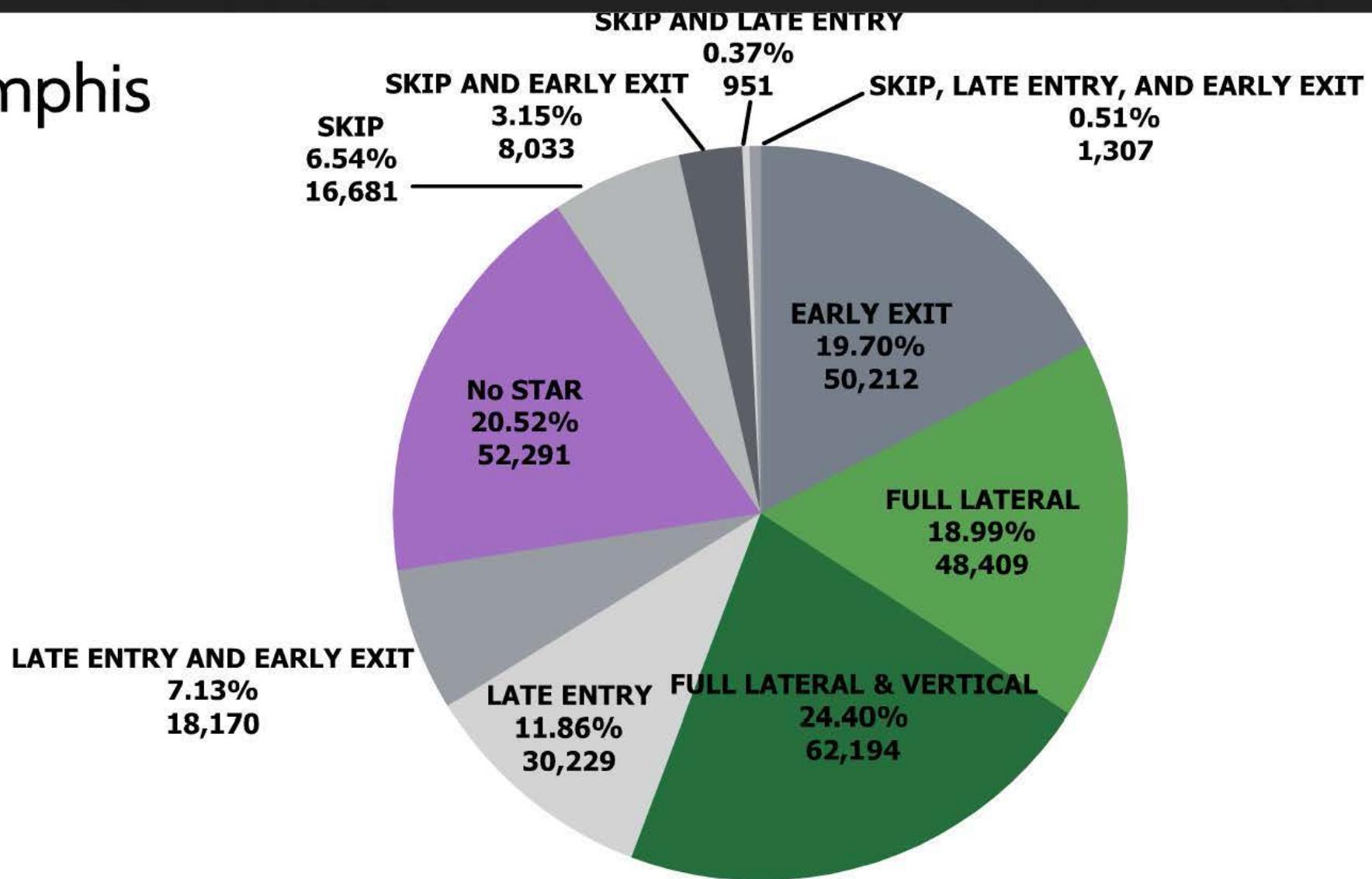
Data

Assess Levels of Use

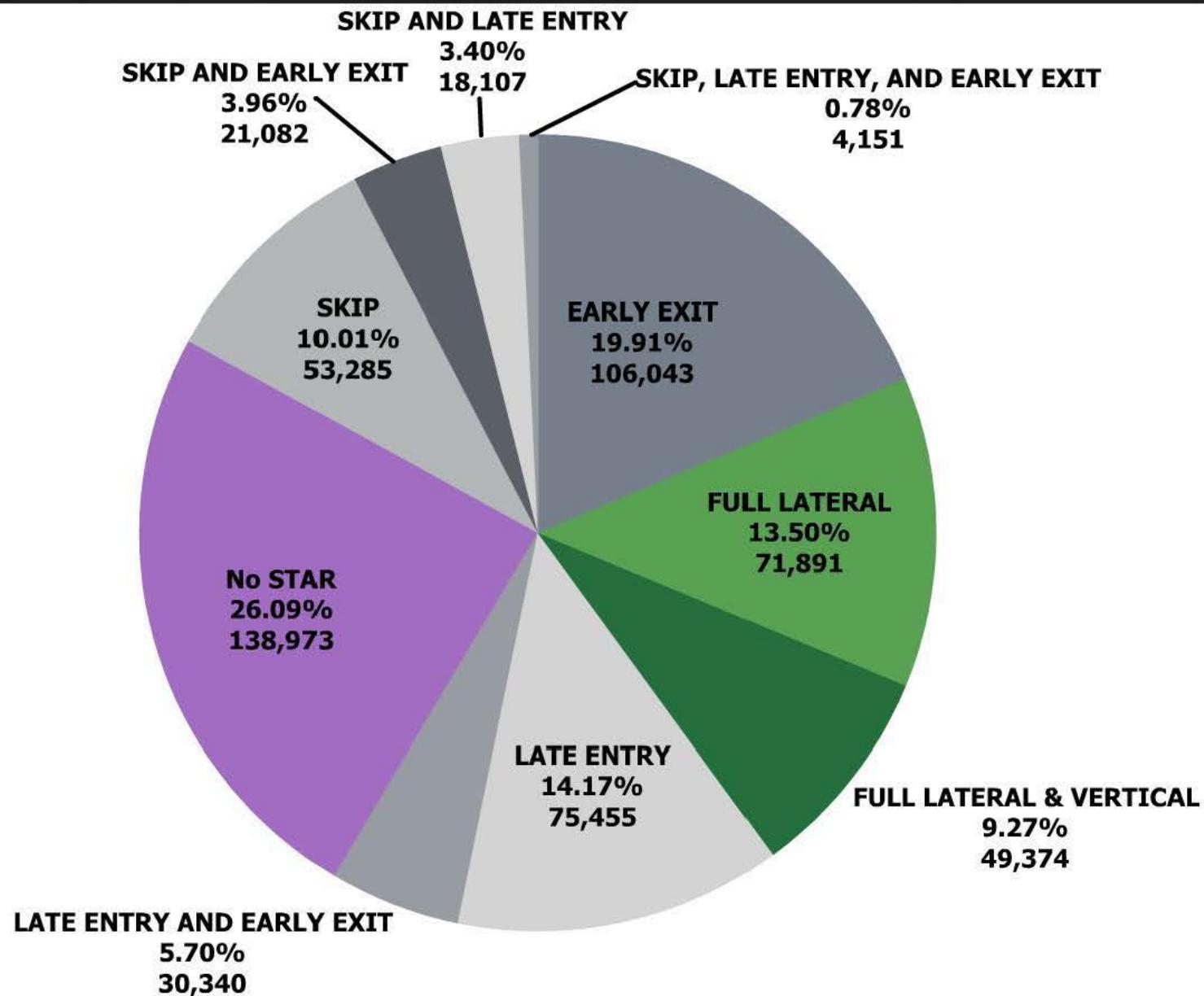




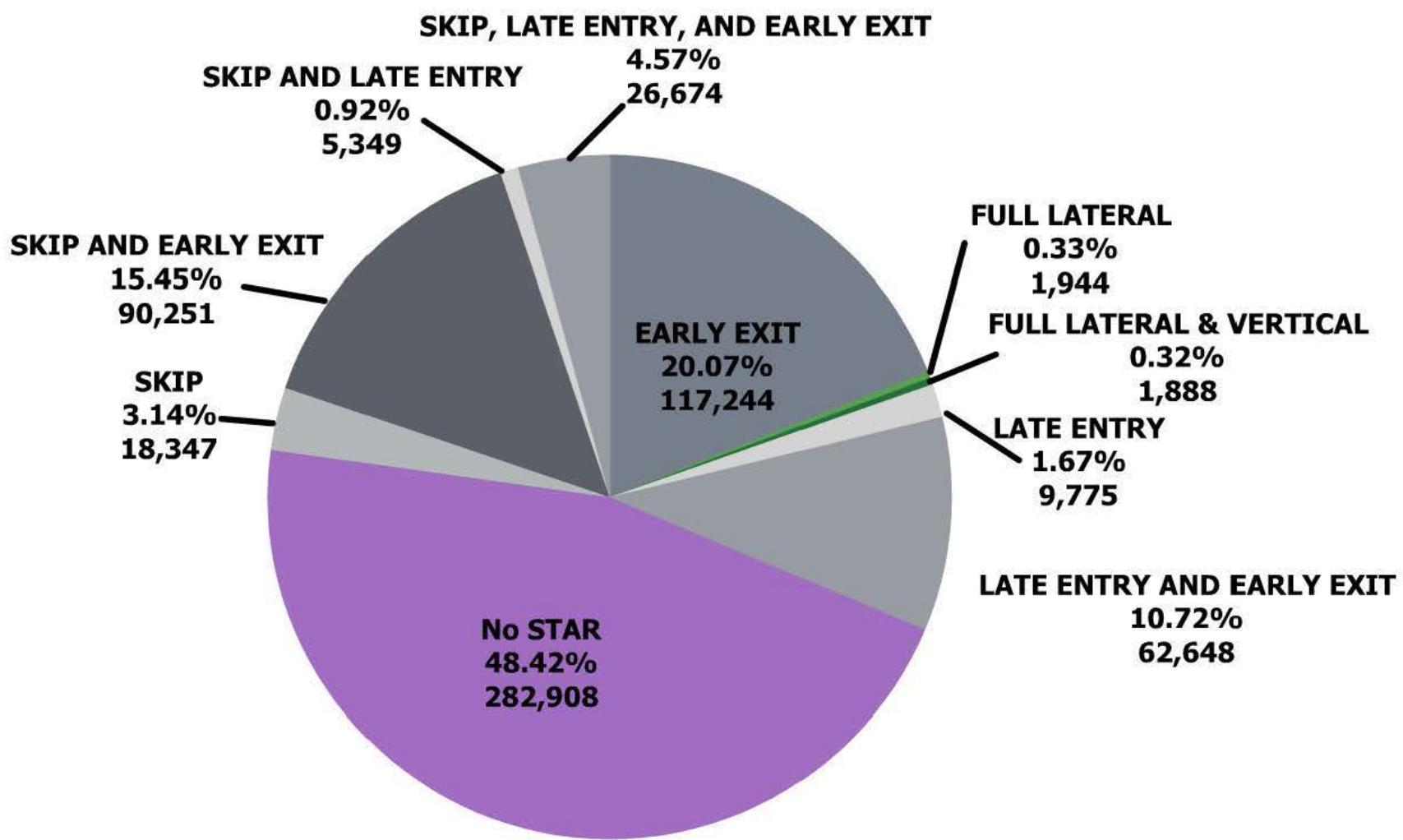
Memphis

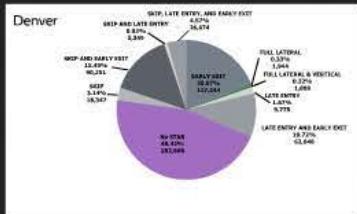


Houston

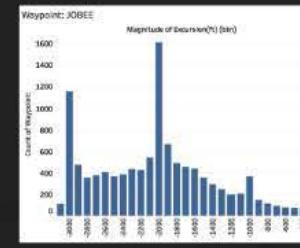
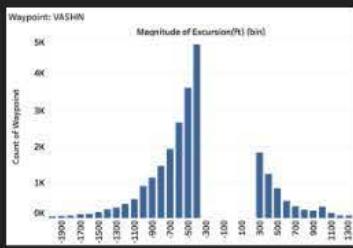


Denver



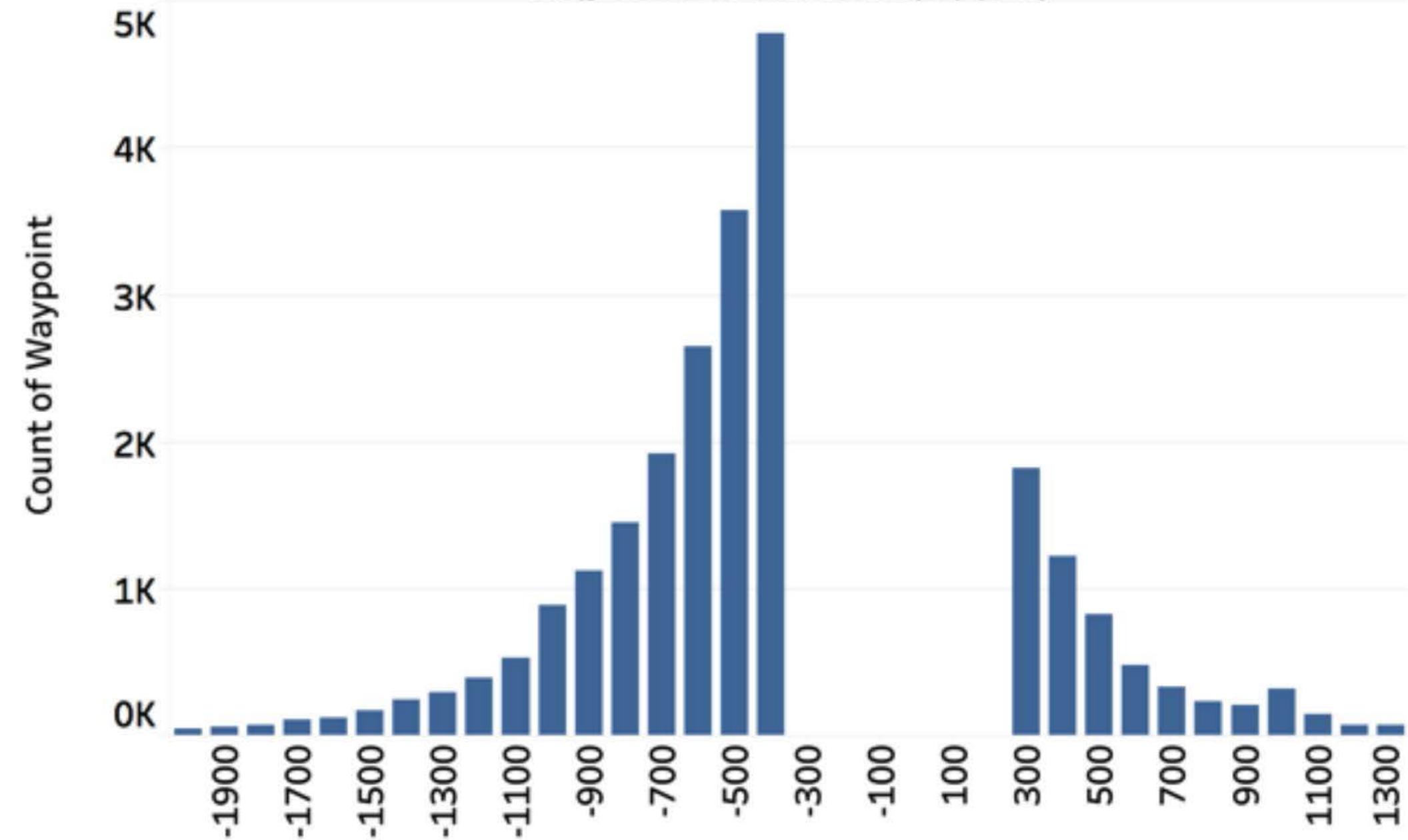


Identify Human Intervention



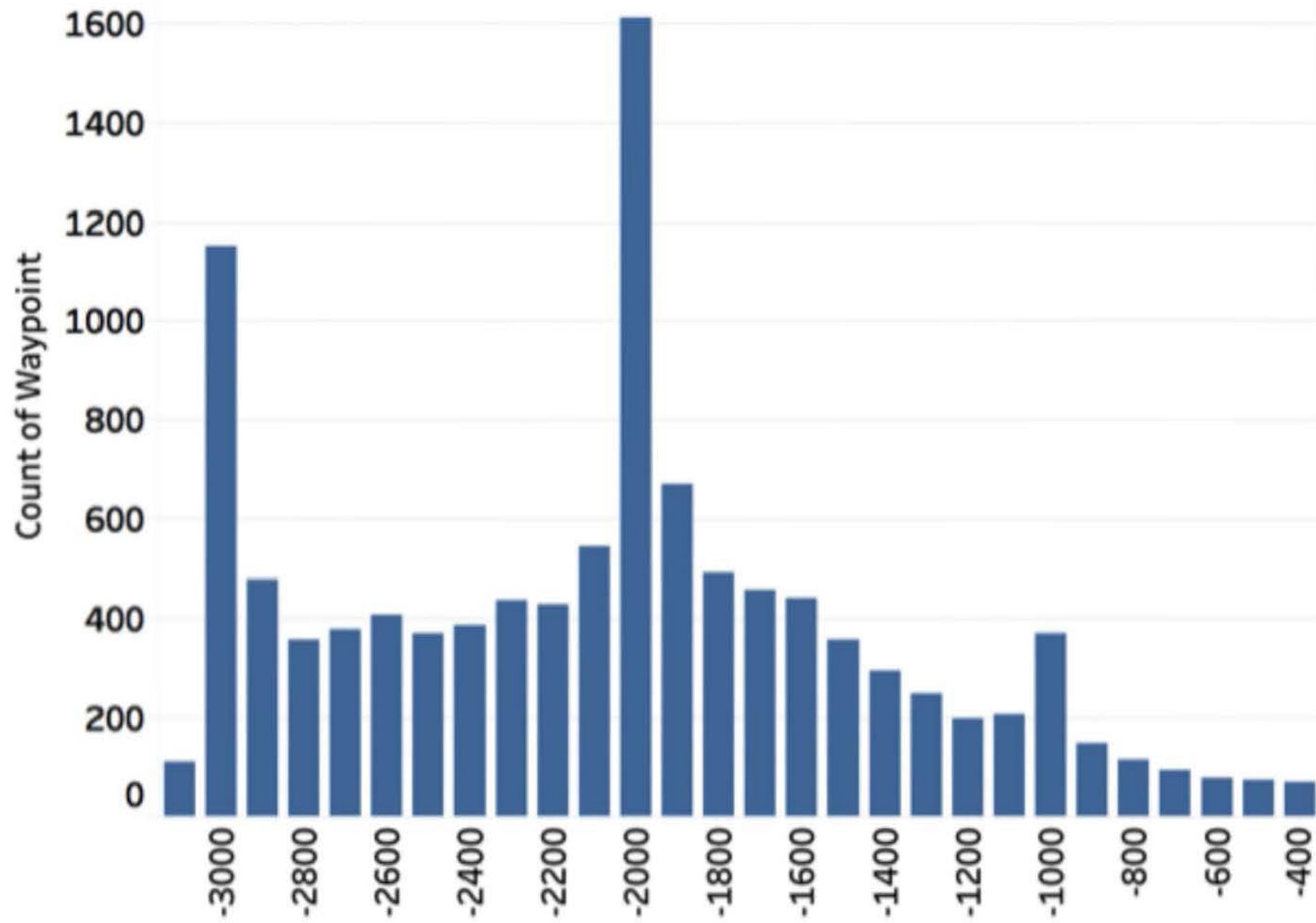
Waypoint: VASHN

Magnitude of Excursion(ft) (bin)

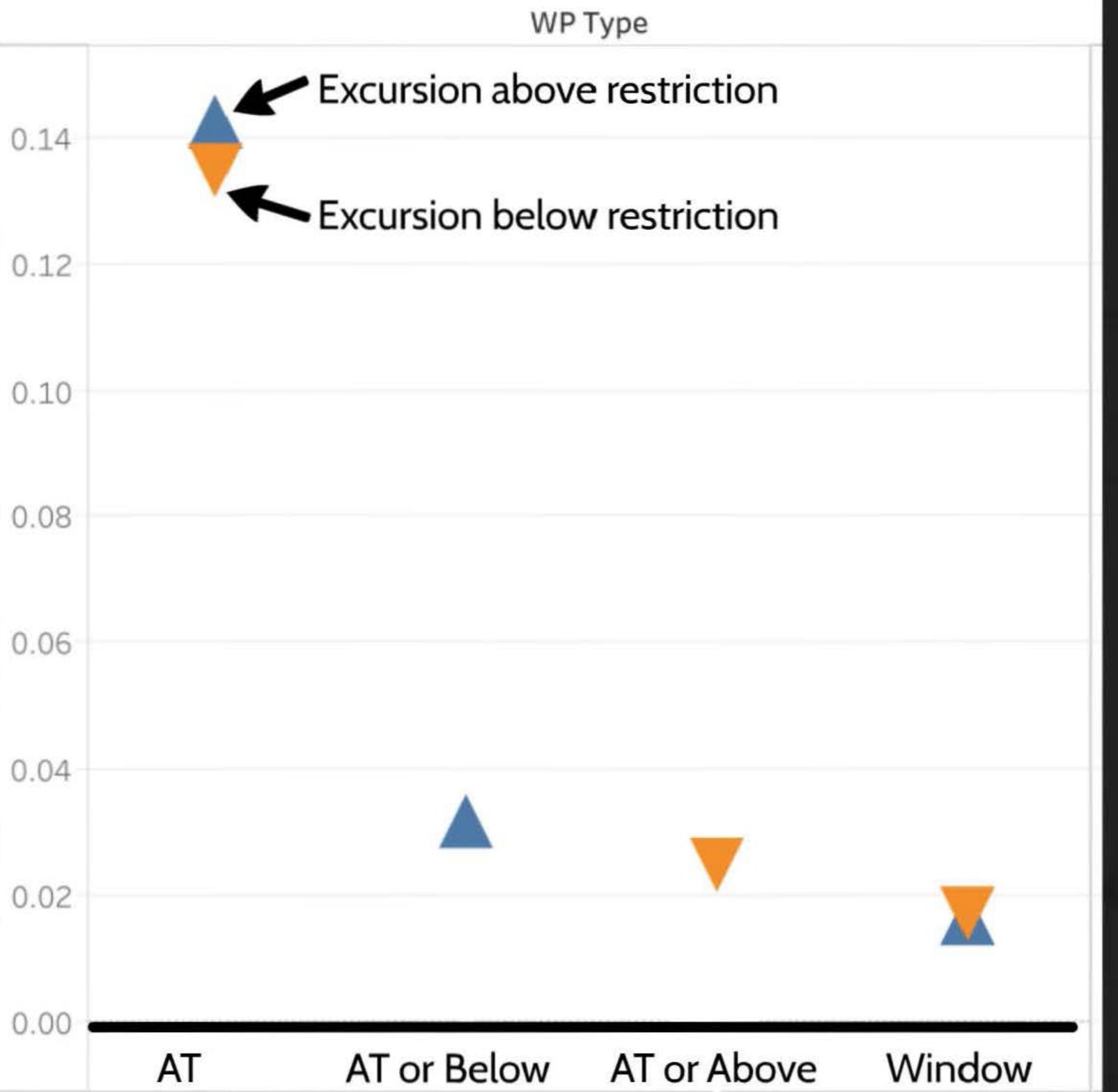


Waypoint: JOBEE

Magnitude of Excursion(ft) (bin)



Excursion Percentage



Next Steps

Data Visualization & synthesis

Monitor trends

Observe efficacy of mitigation strategies

Observe factors that influence degradation

Set acceptability metrics

Decision support for designers

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